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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,770	10/17/2003	In-sang Song	277/007	7730
7590	12/07/2005		EXAMINER	
LEE & STERBA, P.C. Suite 2000 1101 Wilson Boulevard Arlington, VA 22209				MRUK, GEOFFREY S
			ART UNIT	PAPER NUMBER
			2853	

DATE MAILED: 12/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/686,770	SONG, IN-SANG	
	Examiner	Art Unit	
	Geoffrey Mruk	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 23 August 2005.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1 and 4-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1, 4-17, and 20-22 is/are rejected.
- 7) Claim(s) 18 and 19 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
  - Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

<ol style="list-style-type: none"> <li>1)<input checked="" type="checkbox"/> Notice of References Cited (PTO-892)</li> <li>2)<input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)</li> <li>3)<input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.</li> </ol>	<ol style="list-style-type: none"> <li>4)<input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.</li> <li>5)<input type="checkbox"/> Notice of Informal Patent Application (PTO-152)</li> <li>6)<input type="checkbox"/> Other: _____.</li> </ol>
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## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 4-17, and 20-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Kondo et al. (US 6,422,685 B1).

With respect to claim 1, Kondo discloses a printer head (Fig. 2, element 10) using a radio frequency micro-electromechanical system (RF MEMS) sprayer (Column 7, lines 9-24), comprising:

- an inner pressure chamber (Fig. 2, element 106) having a liquid inlet and a liquid outlet (Fig. 2, element 108);
- a cavity resonator surrounding (Fig. 2, element 100) the inner pressure chamber, wherein the cavity resonator provides a predetermined cavity resonance frequency signal to increase an inner pressure of the inner pressure chamber (Column 2, lines 55-65);
- a signal transmitting unit (Fig. 2, element 121) for generating the predetermined cavity resonance frequency signal and for inputting the generated cavity

resonance frequency signal into the inner pressure chamber through the cavity resonator in response to an external input control signal (Column 6, lines 56-64), the signal transmitting unit being electrically isolated (Fig. 2, element 111, i.e. electric ground) from the cavity resonator; and

- a liquid chamber (Fig. 7, elements Y, C, M, K) for supplying a liquid to the inner pressure chamber, the liquid chamber being in flow communication with the inner pressure chamber through the liquid inlet,
- wherein the liquid inlet and the liquid outlet (Fig. 2, element 108) each extend through the inner pressure chamber and the cavity resonator so that when an inner pressure of the inner pressure chamber is increased by the cavity resonator, a liquid from within the inner pressure chamber is ejected outwardly through the liquid outlet (Column 2, lines 46-54).

With respect to claim 4, Kondo discloses a substrate (Fig. 2, element 107) having a nozzle (Fig. 2, element 108) dispersed in a position corresponding to the liquid outlet, wherein the cavity resonator (Fig. 2, element 100) includes a coupling slot (Fig. 2, element 105) formed on a lower side of the cavity resonator, which is in contact with the substrate (Fig. 2, element 104), the coupling slot receiving the cavity resonance frequency signal from the cavity resonator (Column 6, lines 50-55).

With respect to claim 5, Lee discloses the signal-transmitting unit (Fig. 2, element 121) is disposed at a position corresponding (Fig. 2, element 102) to the coupling slot (Fig. 2, element 105) with the substrate (Fig. 2, element 104) being disposed there between.

With respect to claim 6, Lee discloses the signal-transmitting unit (Fig. 2, element 121) comprises:

- a signal generator (Fig. 3, element 202) for generating the cavity resonance frequency signal; and
- a signal input terminal (Fig. 2, element 103) disposed at a position corresponding to the coupling slot (Fig. 2, element 105) for inputting the cavity resonance signal to the cavity resonator (Fig. 2, element 100) through the coupling slot.

With respect to claim 7, Lee discloses the signal-transmitting unit (Fig. 2, element 121) further comprises a signal amplifier (Fig. 3, element 204) for amplifying the cavity resonance frequency signal from the signal generator (Column 7, lines 9-24).

With respect to claim 8, Lee discloses a substrate (Fig. 2, element 107) having a nozzle (Fig. 2, element 108) disposed in a position corresponding to the liquid outlet, wherein the signal-transmitting unit (Fig. 2, element 121) is disposed at a position (Fig. 2, element 102) on the substrate (Fig. 2, element 104) corresponding to the liquid outlet, the substrate (Fig. 2, element 104) being disposed there between, the signal transmitting unit inputs the cavity resonance signal into the cavity resonator (Fig. 2, element 106) through the liquid outlet (Fig. 2, element 108), wherein the nozzle extends to a position corresponding to the liquid outlet.

With respect to claim 9, Kondo discloses the cavity resonator (Fig. 2, element 100) further comprises a coupling slot (Fig. 2, element 105) formed on a side of the cavity resonator for receiving the cavity resonance frequency signal into the cavity resonator (Column 6, lines 50-55).

With respect to claim 10, Kondo discloses the liquid inlet prevents a liquid inside the inner pressure chamber (Fig. 2, element 106) from flowing back (Column 9, lines 41-52, i.e. forming an image on a recording medium) into the liquid chamber (Fig. 7, elements Y, C, M, K) when an inner pressure of the inner pressure chamber is increased by the cavity resonator (Fig. 2, element 100).

With respect to claim 11, Kondo discloses the substrate (Fig. 2, element 104) further comprises a plurality of nozzles (Column 9, lines 28-35), each nozzle corresponding to a position of one of a plurality of liquid outlets (Fig. 2, element 108).

With respect to claim 12, Kondo discloses the inner pressure chamber (Fig. 2, element 106) surrounded by the cavity resonator (Fig. 2, element 100) is a plurality of inner pressure chambers, each being surrounded by a respective one of a plurality of cavity resonators, and wherein each of the plurality of inner pressure chambers is disposed at a predetermined distance interval from an adjacent one of the plurality of inner pressure chambers (Column 9, lines 28-52).

With respect to claim 13, Kondo discloses a substrate (Fig. 2, element 107) having a nozzle disposed in a position corresponding to the liquid outlet (Fig. 2, element 108), the substrate being attached to a lower side of the cavity resonator (Fig. 2, element 104) where the liquid outlets are formed, wherein the signal transmitting unit is attached (Fig. 2, element 102) to the substrate opposite the cavity resonator.

With respect to claim 14, Kondo discloses the signal-transmitting (Fig. 2, element 121) unit extends past (Fig. 2, element 102) the liquid outlet (Fig. 2, element 108) and having a hole disposed in a position corresponding to the liquid outlet.

With respect to claim 15, Kondo discloses the signal-transmitting unit (Fig. 3, element 121) comprises: a signal generator (Fig. 3, element 202) for generating the cavity resonance frequency signal; and a signal input terminal (Fig. 2, element 103) disposed at a position to the hole for inputting the cavity resonance signal to the cavity resonator through the hole.

With respect to claim 16, Kondo discloses the signal-transmitting unit (Fig. 3, element 121) further comprises: a signal amplifier (Fig. 3, element 204) for amplifying the cavity resonance frequency signal from the signal generator.

With respect to claim 17, Kondo discloses an amplification factor of the signal amplifier is adjusted to control a pressure of the inner pressure chamber (Column 7, lines 9-61).

With respect to claim 20, Kondo discloses an amplification factor of the signal amplifier (Fig. 3, element 204) is adjusted to control a pressure of the inner pressure chamber (Column 7, lines 9-61).

With respect to claim 21, Kondo discloses a printer head (Fig. 2, element 10) using a radio frequency micro-electromechanical system (RF MEMS) sprayer (Column 7, lines 9-24), comprising:

- an inner pressure chamber (Fig. 2, element 106) having a liquid inlet and a liquid outlet (Fig. 2, element 108);
- a cavity resonator (Fig. 2, element 100) surrounding the inner pressure chamber, wherein the cavity resonator controls an inner pressure of the inner pressure chamber (Column 2, lines 55-65);

- an antenna (Fig. 2, element 103) providing a cavity resonance frequency signal to the cavity resonator (Column 7, lines 9-61); and
- a liquid chamber (Fig. 7, elements Y, C, M, K) for supplying a liquid to the inner pressure chamber, the liquid chamber being in flow communication with the inner pressure chamber through the liquid inlet,
- wherein the liquid inlet and the liquid outlet (Fig. 2, element 108) each extend through the inner pressure chamber and the cavity resonator so that when an inner pressure of the inner pressure chamber is increased by a cavity resonance frequency signal supplied to the cavity resonator, a liquid from within the inner pressure chamber is ejected outwardly through the liquid outlet (Column 2, lines 46-54).

With respect to claim 22, Kondo discloses the cavity resonator (Fig. 2, element 100) further comprises a coupling slot (Fig. 2, element 105) formed on a side of the cavity resonator for receiving the cavity resonance frequency signal into the cavity resonator (Column 6, lines 50-55).

#### ***Allowable Subject Matter***

Claims 18 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

The examiner makes of record the claim objection dated 26 May 2005 has been withdrawn in view of applicant's remarks. Applicant's arguments, see page 8 lines 6-21, filed 23 August 2005, with respect to the rejection(s) of claim(s) 1-12 under 35 USC § 102b have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kondo et al. (US 6,422,685, B1).

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GSM  
12/5/2005

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MANISH S. SHAH  
PRIMARY EXAMINER